Product Information

Cementless Threaded Cup System

smith&nephew
BICON-PLUS™
Clinically proven for over 25 Years

With its Bi-conical shape Smith & Nephew’s BICON-PLUS threaded acetabular system has been clinically proven in the management of primary and revision cases with a stable anchorage without additional screw fixation.\(^1,2,4,9,10\)

Threaded cups offer a high primary stability.\(^1\)

The first generation of BICON-PLUS was introduced in 1992. In 2002 the second generation, with a closed shell rim, was launched. Today, more than 450,000 units have been sold all over the world.

We remain just as convinced today as we were 25 years ago, that the conical principle provides conditions allowing primary stability and secondary osteointegration in cementless cup anchoring.\(^1,2,4,7,8\)
Double cone principle
The anatomical approximation to the acetabulum requires less bone resection, compared to a conical shaped cup.\textsuperscript{4,5}

Biconical shell design
The biconical design provides an approximation of the implant to the spherical form of the bony acetabulum.

Thread and tooth profile
The sharp-cutting thread blades of the BiCON-PLUS cup enable penetration of the thread teeth into the subchondral sclerotic zone.\textsuperscript{7} The thread and tooth profile is anatomically adapted for all cup sizes.

Articulation bearings
The BiCON-PLUS system has a wide range of combination options, making it suitable for many different surgical indications. Either hard-soft or hard-hard-bearing, whereby the comprehensive range includes cross-linked polyethylene (XLPE), conventional polyethylene (PE) and BIOLOX\textsuperscript{®} delta inserts. Most XLPE and PE inserts are also available in an antiluxation version. Different ball head diameters are available, ranging up to 36mm, depending on the cup size.
Features

The double cone
• The anatomical approximation to the acetabulum requires less bone resection compared to a conical shaped cup.\textsuperscript{4, 5}
• Broad seating in the acetabulum, especially at the front end of the cup
• Possibility to fully screw into the previously reamed bony bed, thanks to the tooth and thread form

The tooth form
• Tooth size, tooth thickness and tooth height matched to cup size
• Thread and tooth size increase with increasing cup size:
  - smaller cup – smaller thread and tooth form
  - larger cup – larger thread and tooth form

The surface roughness
• The average roughness of the titanium shell is 5 $\mu$m$^2$
• The dual-taper design, together with the macrostructure of the thread teeth, ensures reliable primary stability and, in combination with the surface microstructure, promotes long-term osteointegration.\textsuperscript{1, 2, 4, 7, 8}

The closed rim
• Direct PE-bone contact can be avoided
The sector closure

- Open sectors allow full view during the implantation procedure.
- Spongiosaplasty can be performed through these openings, if necessary.
- After screwing in the cup shell, the sectors are closed to avoid any polyethylene-bone contact.

The articulation bearings

- XLPE (highly crosslinked PE) standard version for ball heads 22, 28, 32 and 36 mm, and antilux version for ball heads 22, 28 and 32 mm.
- PE standard and antiluxation version for ball heads 22, 28 and 32 mm.
- BIOLOX® delta Ceramic/PE-insert standard version for ball heads 32 and 36 mm.
BICON-PLUS° System

Shells

<table>
<thead>
<tr>
<th>Size/Ø mm</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/37*</td>
<td>x</td>
</tr>
<tr>
<td>0/40*</td>
<td>x</td>
</tr>
<tr>
<td>1/43</td>
<td>x</td>
</tr>
<tr>
<td>2/46</td>
<td>x</td>
</tr>
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<td>7/63</td>
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<tr>
<td>8/68*</td>
<td>x</td>
</tr>
<tr>
<td>9/72*</td>
<td>x</td>
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*Special sizes

Inserts

<table>
<thead>
<tr>
<th>Material</th>
<th>Ball head Ø/size mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22</td>
</tr>
<tr>
<td>PE insert Standard</td>
<td>01-0</td>
</tr>
<tr>
<td>PE insert Antilux</td>
<td>01-0</td>
</tr>
<tr>
<td>XLPE insert Standard</td>
<td>01-0</td>
</tr>
<tr>
<td>XLPE insert Antilux</td>
<td>01-0</td>
</tr>
<tr>
<td>BIOLOX® delta/PE insert Standard</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Materials

**BICON-PLUS cup shell**
High-grade-forged pure titanium according to ISO standard 5832-2

**PE inserts**
UHMW polyethylene according to ISO standard 5834-2

**XLPE inserts**
Highly cross-linked polyethylene made of form-pressed GUR-1050
UHMW-PE according to ISO standard 5834-2

**Ceramic/PE inserts BIOLOX® delta**
High quality aluminum (Al2O3)/zirconium oxide (ZrO2)
Composite ceramic BIOLOX® delta according to ISO standard 6474-2.2
Clinical Results

Zweymüller et al.\(^1\) report an implant survival rate of 99.3% after 10 years. The endpoint was revision for any reason. They also observed that even in problematic cases there was an increase in bone substance around the cranial margin of the cup and the socket floor, indicating secondary osteointegration. On examination the standard ultra-high-molecular-weight (UHMW) polyethylene cup inserts demonstrated low abrasion rates (0.13 mm/year).\(^1\) Stable anchorage of the polyethylene (UHMW) insert in the cup is essential to ensure reduced polyethylene abrasion.\(^2\) The authors of the study concluded: “These intermediate results compare favorably with survivorship and periacetabular bone reaction data observed with the best cementless acetabular implant designs”. Milosev et al\(^11\) report an implant survival rate of 99.5% after 10 years, with aseptic revision as the endpoint in the metal-polyethylene articulation bearings.

**Conclusions:** To date results published by experts on the BICON-PLUS screw cup design have been consistently positive. Numerous studies have proven excellent survival rates of over 99%.\(^1,2,4,9,11\)

**Summary of publication ‘Good Stability and Minimal Osteolysis with a Biconical Threaded Cup at 10 Years.’ by Karl A. Zweymüller et al:**

Between January 1993 and June 1994, 376 BICON-PLUS cups were implanted in combination with a ceramic-on-PE articulation. 232 hips were reviewed after 10.0 to 13.1 (mean 10.3) years. The mean Harris hip score was 93.1 at 10 years and more. The 10-year Kaplan-Meier survivor curve with revision for any reason as an event of interest was 99.3% (95% CI: 96.9 – 99.8%). There were two implant revisions. One revision was attributable to an infection and one was for cup fracture. No liner was exchanged because of wear problems or instability. Mean liner head penetration was 1.33 mm with a standard deviation of 0.66 mm, equaling a mean linear wear rate of 0.13 mm per year. Gaps between the cup floor and the bone tended to be spontaneously obliterated by newly formed bone.